

N-Channel Enhancement Mode Power MOSFET

Description

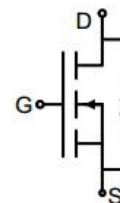
The G160N04S uses advanced trench technology to provide excellent $R_{DS(ON)}$, low gate charge. It can be used in a wide variety of applications.

General Features

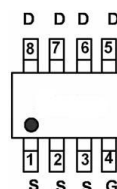
- V_{DS} 40V
- I_D (at $V_{GS} = 10V$) 9A
- $R_{DS(ON)}$ (at $V_{GS} = 10V$) < 15m Ω
- $R_{DS(ON)}$ (at $V_{GS} = 4.5V$) < 20m Ω
- 100% Avalanche Tested
- RoHS Compliant

Application

- Power switch
- DC/DC converters



Schematic diagram



pin assignment



SOP-8

Ordering Information

Device	Package	Marking	Packaging
G160N04S	SOP-8	G160N04	4000pcs/Reel

Absolute Maximum Ratings $T_C = 25^\circ\text{C}$, unless otherwise noted

Parameter	Symbol	Value	Unit
Drain-Source Voltage	V_{DS}	40	V
Continuous Drain Current	$T_C = 25^\circ\text{C}$	9	A
	$T_C = 100^\circ\text{C}$	5.7	
Pulsed Drain Current (note1)	I_{DM}	36	A
Gate-Source Voltage	V_{GS}	± 20	V
Power Dissipation	P_D	2.5	W
Single pulse avalanche energy (note2)	E_{AS}	12	mJ
Operating Junction and Storage Temperature Range	T_J, T_{stg}	-55 To 150	$^\circ\text{C}$

Thermal Resistance

Parameter	Symbol	Value	Unit
Thermal Resistance, Junction-to-Ambient, $t \leq 10s$	R_{thJA}	50	$^\circ\text{C/W}$

Specifications T _J = 25°C, unless otherwise noted						
Parameter	Symbol	Test Conditions	Value			Unit
			Min.	Typ.	Max.	
Static Parameters						
Drain-Source Breakdown Voltage	V _{(BR)DSS}	V _{GS} = 0V, I _D = 250μA	40	--	--	V
Zero Gate Voltage Drain Current	I _{DSS}	V _{DS} = 40V, V _{GS} = 0V	--	--	1	μA
Gate-Source Leakage	I _{GSS}	V _{GS} = ±20V	--	--	±100	nA
Gate-Source Threshold Voltage	V _{GS(th)}	V _{DS} = V _{GS} , I _D = 250μA	1.0	1.6	2.0	V
Drain-Source On-Resistance	R _{DS(on)}	V _{GS} = 10V, I _D = 4A	--	11	15	mΩ
		V _{GS} = 4.5V, I _D = 3A	--	14.5	20	
Forward Transconductance	g _{FS}	V _{GS} = 5V, I _D = 4A	--	12	--	S
Dynamic Parameters						
Input Capacitance	C _{iss}	V _{GS} = 0V, V _{DS} = 20V, f = 1.0MHz	--	1000	--	pF
Output Capacitance	C _{oss}		--	90	--	
Reverse Transfer Capacitance	C _{rss}		--	80	--	
Total Gate Charge	Q _g	V _{DD} = 20V, I _D = 4A, V _{GS} = 10V	--	24	--	nC
Gate-Source Charge	Q _{gs}		--	3	--	
Gate-Drain Charge	Q _{gd}		--	5	--	
Turn-on Delay Time	t _{d(on)}	V _{DD} = 20V, I _D = 4A, R _G = 3Ω	--	5	--	ns
Turn-on Rise Time	t _r		--	13	--	
Turn-off Delay Time	t _{d(off)}		--	22	--	
Turn-off Fall Time	t _f		--	11	--	
Drain-Source Body Diode Characteristics						
Continuous Body Diode Current	I _S	T _C = 25°C	--	--	9	A
Body Diode Voltage	V _{SD}	T _J = 25°C, I _{SD} = 4A, V _{GS} = 0V	--	--	1.2	V
Reverse Recovery Charge	Q _{rr}	I _F = A, V _{GS} = 0V di/dt=100A/us	--	35	--	nC
Reverse Recovery Time	T _{rr}		--	31	--	ns

Notes

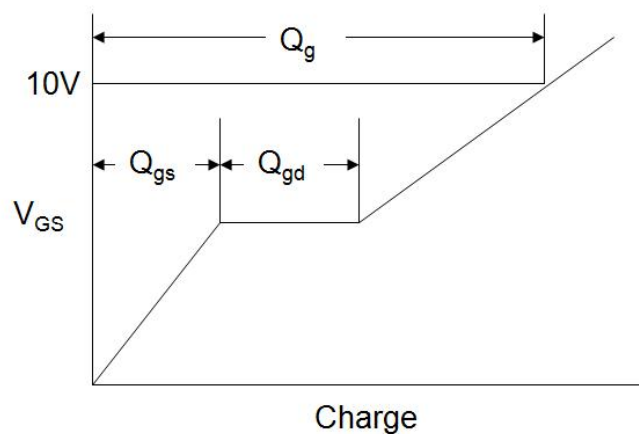
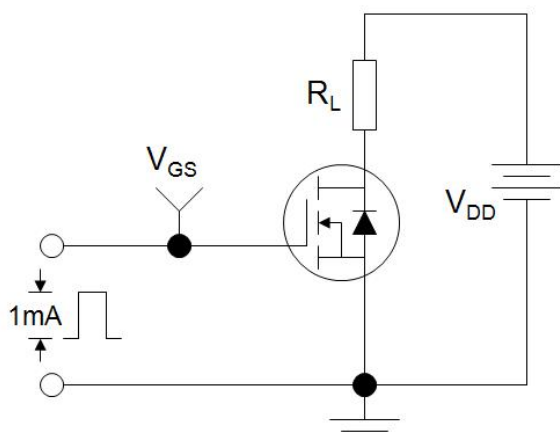
1. Repetitive Rating: Pulse width limited by maximum junction temperature

2. EAS condition : $T_J = 25^{\circ}\text{C}$, $V_{DD} = 40V$, $V_{GS} = 10V$, $L = 0.5mH$, $R_G = 25\Omega$

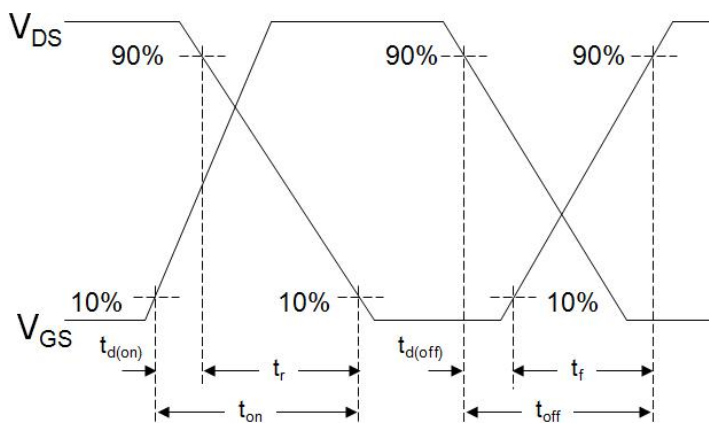
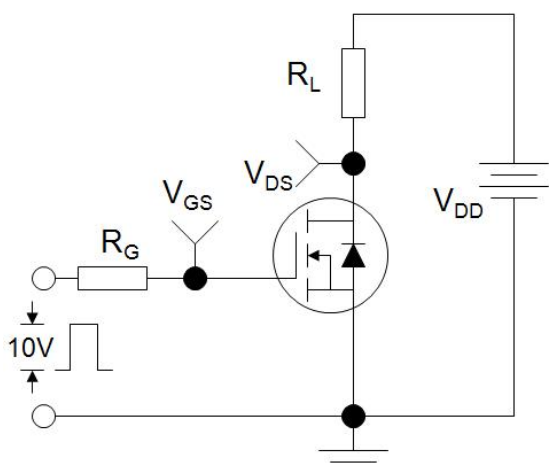
The table shows the minimum avalanche energy, which is 30mJ when the device is tested until failure

3. Identical low side and high side switch with identical R_G

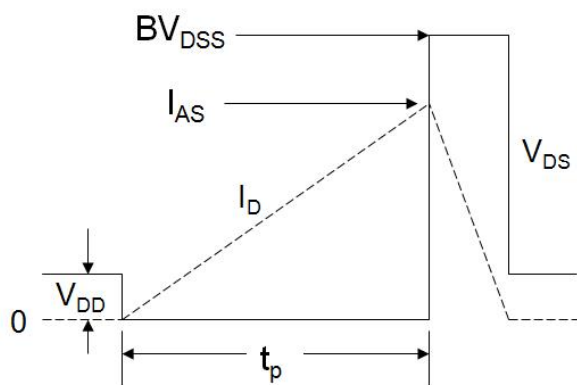
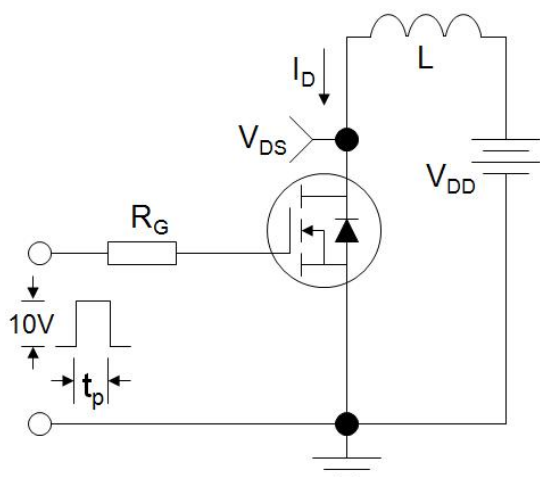
Gate Charge Test Circuit



Switch Time Test Circuit



EAS Test Circuit



Typical Characteristics $T_J = 25^\circ\text{C}$, unless otherwise noted

Figure 1. Output Characteristics

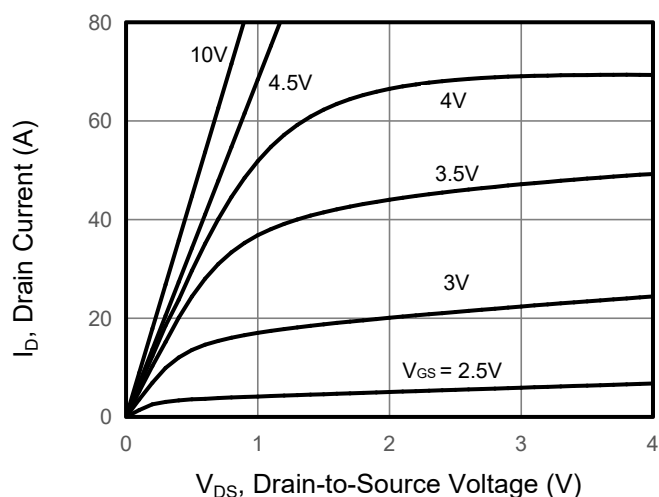


Figure 2. Transfer Characteristics

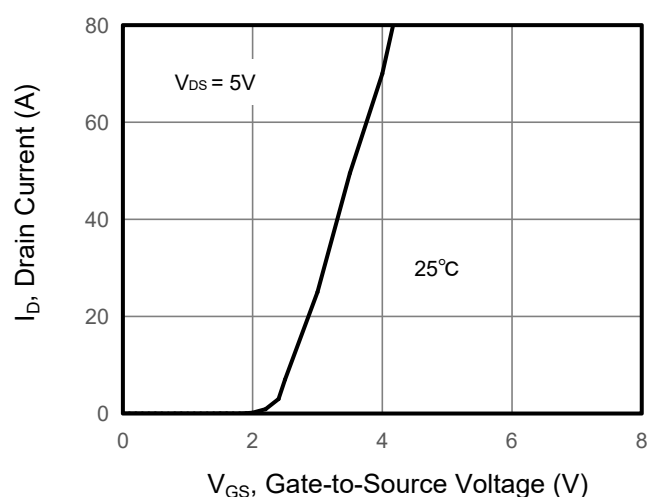


Figure 3. Drain Source On Resistance

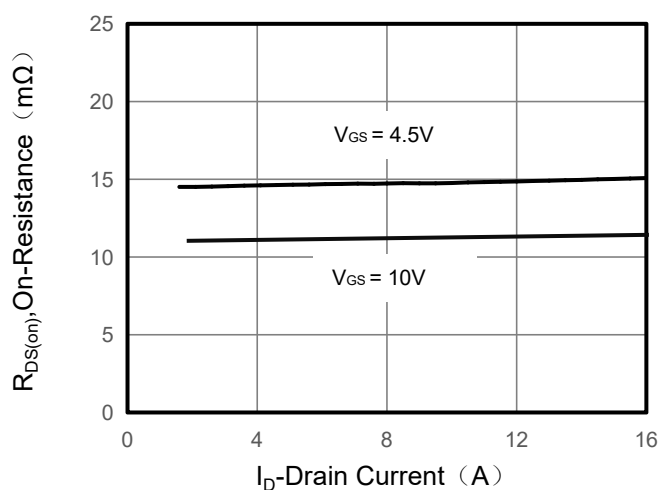


Figure 4. Gate Charge

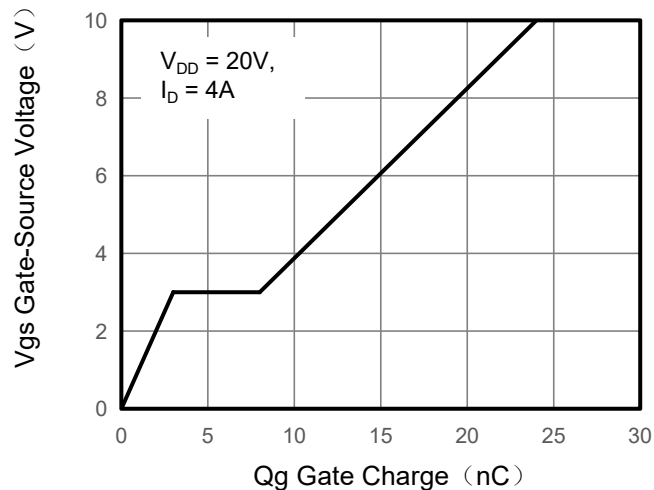


Figure 5. Capacitance

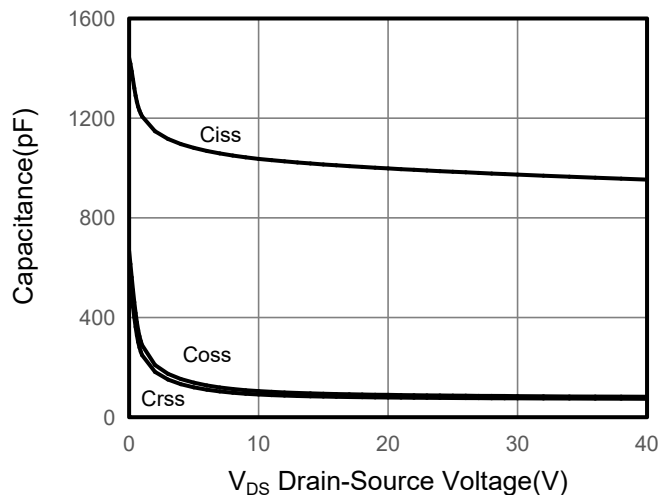
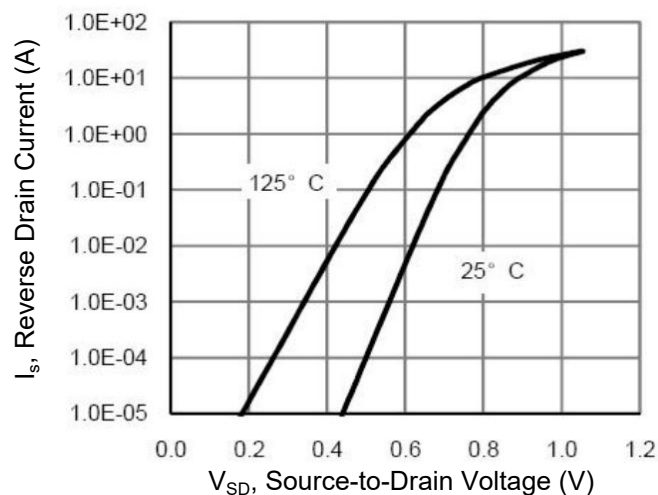


Figure 6. Source-Drain Diode Forward



Typical Characteristics $T_J = 25^\circ\text{C}$, unless otherwise noted

Figure 7. Drain-Source On-Resistance

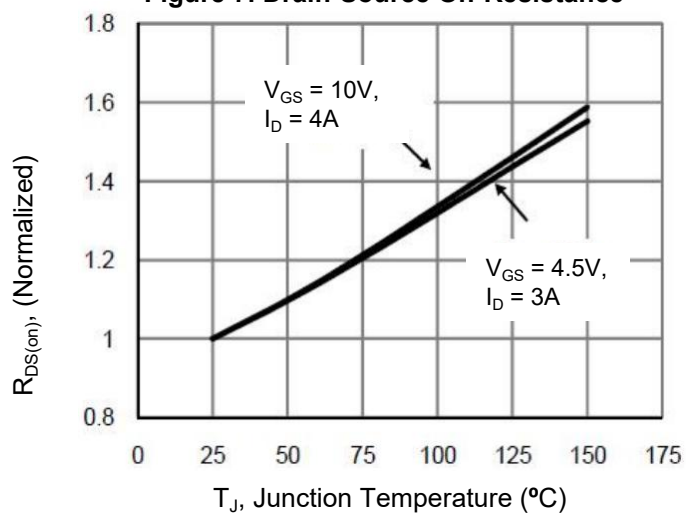


Figure 8. Safe Operation Area

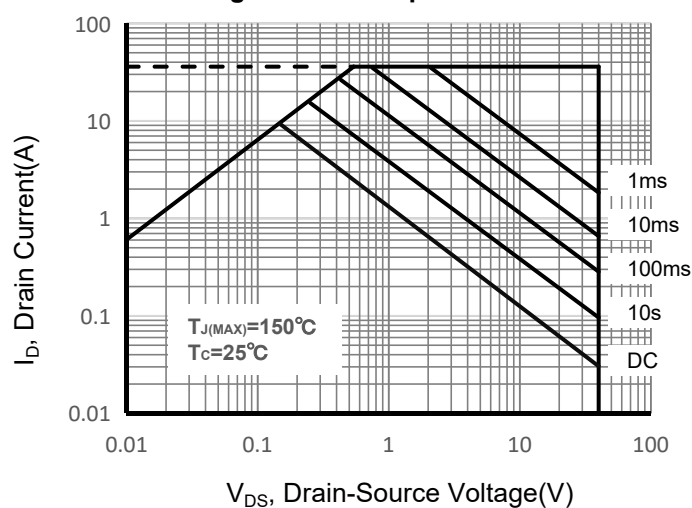


Figure 9. Maximum Continuous Drain Current vs Case Temperature

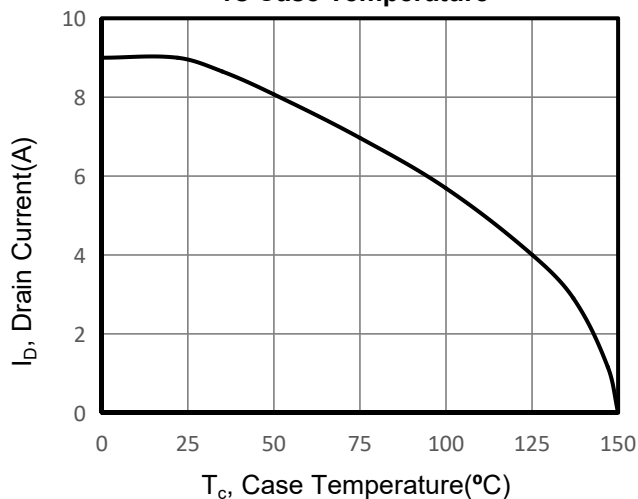
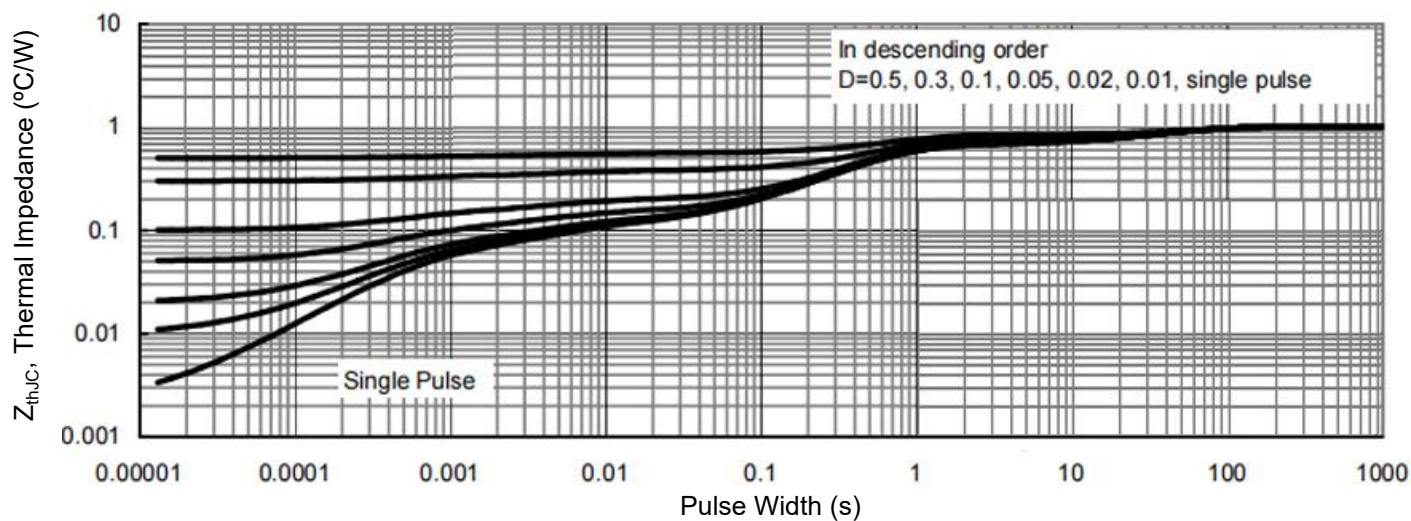


Figure 10. Normalized Maximum Transient Thermal Impedance



Technical drawing of a rectangular plate with the following dimensions and features:

- Overall width: 6.04
- Overall height: ± 0.05
- Top edge features: Four vertical slots, each with a width of 0.4 and a depth of 1.27.
- Bottom edge features: Four vertical slots, each with a width of 0.4 and a depth of 0.88.
- Internal features: A central horizontal slot with a width of 1.0 and a depth of 0.8.
- Internal features: A circular hole with a diameter of $\varnothing 0.8$.
- Internal features: A dashed circle indicating a feature on the right side.

[illegible]